MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

QUADRILATERALS

Others

1. The sides AB and CD of a parallelogram $ABCD$ are bisected at $E and F$. Prove that $EBFD$ is a parallelogram.

▶ **Watch Video Solution**

2. In Figure, $ABCD$ is a trapezium in which $ABCD$ and $AD = BC$. show that : $\angle A = \angle B$ (ii) $\angle C = \angle D$ $ABC \cong BAD$ diagonal $AC = diagonal BD$

3. Prove that If the diagonals of a parallelogram are perpendicular, then it is a rhombus.

4. Show that the diagonals of a rhombus are perpendicular to each other

5. If the diagonals of a parallelogram are equal and intersect at right angles, then the parallelogram is a square.

▶ **Watch Video Solution**

6. Show that the diagonals of a square are equal and bisect each other at right angles.

▶ **Watch Video Solution**

7. The diagonals of a rectangle $ABCD$ meet at O. If $\angle BOC = 44^0$, find $\angle OAD$.

8. $PQRS$ is a square. PR and SQ intersect at $O.$ State the measure of $\angle POQ.$

9. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that: (i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D.$.

10. $ABCD$ is a rhombus with $\angle ABC = 56^0$. Determine $\angle ACD$.

▶ **Watch Video Solution**

11. Each of the four angles of a rectangle is a right angle.

▶ **Watch Video Solution**

12. Each of the four sides of a rhombus is of the same length.

▶ **Watch Video Solution**

13. AB, CD are two parallel lines and a transversal l intersects AB at X and CD at Y Prove that the bisectors of the interior angles form a parallelogram, with all its angles right angles i.e., it is a rectangle.

▶ **Watch Video Solution**

14. If ABC and DEF are two triangles such that AB, BC are respectively equal and parallel to $DE, EF,$ then show that (i) quad ABED is a parallelogram (ii) quad BCFE is a paralellogram (iii) AC=DF (iv) $\triangle ABC \cong \triangle DEF$

▶ **Watch Video Solution**

15. In Figure, $ABCD$ is a parallelogram and X and Y are points on the diagonal BD such that $DX = BY$. Prove that $AXCY$ is a parallelogram (ii) $AX = CY$, $AY = CX$ $AYB \cong CXD$ (iv) $AXD \cong CYB$

16. Two segments AC and BD bisect each other at O . Prove that $ABCD$ is a parallelogram.

17. Each of the angles of a square is a right angle and each of the four sides is of the same length.

18. The diagonals of a rectangle are of equal length.

19. If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.

20. A quadrilateral is parallelogram if its opposite angles are equal.

21. A quadrilateral is a parallelogram if its opposite sides are equal.

22. Show that the diagonals of a square are equal and bisect each other at right angles.

23. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

24. A quadrilateral is a parallelogram, if its one pair of opposite sides are equal and parallel.

25. In a triangle ABC median AD is produced to X such that $AD = DX.$ Prove that $ABXC$ is a parallelogram.

26. In Figure, $PQRS$ is a parallelogram, PO and QO are, respectively, the angle bisectors of $\angle P$ and $\angle Q.$ Line LOM

is drawn parallel to PQ. Prove that : $PL = QM$ (ii) $LO = OM$

27. The diagonals of a parallelogram $ABCD$ intersect at $O\dot{A}$ line through O intersects AB at X and DC at Y. Prove that $OX = OY$.

28. In a parallelogram $ABCD$, the bisector of $\angle A$ also bisects BC at X. prove that $AD = 2AB$.

29. $ABCD$ is a parallelogram. L and M are points on AB and DC respectively and $AL = CM.$ prove that LM and BD bisect each other.

30. $PQRS$ is a parallelogram. PX and QY are respectively, the perpendiculars from P and Q to SR and RS produced. then

A. $PX = QY$

B. $SX = RY$

C. Both A and B

D. None

Answer: C

31. $ABCD$ is a parallelogram. AB is produced to E so that $BE = AB$. Prove that ED bisects BC.

32. If $ABCD$ is a quadrilateral in which $ABCD$ and $AD = BC,$ prove that $\angle A = \angle B$.

33. Find the measure of all the angles of a parallelogram, if one angle is $24°$ less than twice the smallest angle.

34. The perimeter of a parallelogram is $22cm.$ If the longer side measures $6.5cm$ what is the measure of the shorter side?

35. ABC is a triangle. D is a point on AB such that $AD = \dfrac{1}{4}AB$ and E is a point on AC such that $AE = \dfrac{1}{4}AC.$ Prove that $DE = \dfrac{1}{4}BC.$

36. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other

37. BM and CN are perpendiculars to a line passing through the vertex A of a triangle ABC. If L is the mid-point of BC, prove that $LM = LN$.

38. Given ABC, lines are drawn through A, B and C parallel respectively to the sides BC, CA and AB, forming PQR (Figure). Show that $BC = \dfrac{1}{2}QR$

39. In a parallelogram $ABCD, \angle D = 115°$, determine the measure of $\angle A$ and $\angle B$.

40. In a parallelogram $ABCD$, prove that sum of any two consecutive angles is $180°$

41. $ABCD$ is a parallelogram andline segments AX, CY bisect the angles A and C, respectively Figure. Show that $AXCY$. Figure

42. In a parallelogram $ABCD$ diagonals AC and BD intersect at O and $AC = 6.8cm$ and $BD = 13.6cm$. Find the measures of OC and OD.

43. In a parallelogram, the bisectors of any two consecutive angles intersect at right angle.

▶ Watch Video Solution

44. The diagonals of a parallelogram bisect each other.

▶ Watch Video Solution

45. The angle bisectors of a parallelogram form a rectangle.

▶ Watch Video Solution

46. If diagonal of a parallelogram bisects one of the angles of the parallelogram, it also bisects the second angle. Also, prove that it is a rhombus.

47. Show that the quadrilateral, formed by joining the mid-points of the sides of a square, is also a square.

48. The diagonals of a quadrilateral $ABCD$ are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle.

49. ABCD is a rhombus and P, Q, R, S are the mid-points of AB, BC, CD, DA respectively. Prove that $PQRS$ is a rectangle.

50. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.

51. Prove that the figure formed by joining the mid-points of the pair of consecutive sides of a quadrilateral is a parallelogram. OR $BACD$ is a parallelogram in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. AC is a diagonal. Show that : $PQ \mid \mid AC$ and $PQ = \dfrac{1}{2}AC$ $SR \mid \mid AC$ and $SR = \dfrac{1}{2}AC$ $PQ = SR$ (iv) $PQRS$ is a parallelogram.

52. In a ABC , find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.

53. In ABC, AD is the median through A and E is the mid-point of AD. BE produced meets AC in F (Figure). Prove that $AF = \dfrac{1}{3}AC$.

▶ **Watch Video Solution**

54. P, Q and R are, respectively, the mid-points of sides BC, CA and AB of a triangle ABC, PR and BQ meet at XCR and PQ meet at Y. Prove that $XY = \dfrac{1}{4}BC$.

▶ **Watch Video Solution**

55. P is the mid-point of side AB of a parallelogram $ABCD$. A Line through B parallel to PD meets DC at Q and AD produced at R. Prove that (i) $AR = 2BC$ (ii) $BR = 2BQ$.

56. $ABCD$ is a parallelogram. P is a point on AD such that $AP = \dfrac{1}{3}AD$ and Q is a point on BC such that $CQ = \dfrac{1}{3}BP$. Prove that $AQCP$ is a parallelogram.

57. In a ABC, $BM \, and \, CN$ are perpendiculars from $B \, and \, C$ respectively on any line passing through A. If L is the mid-point of BC, prove that $ML = NL$.

58. In $\triangle ABC$, M, N and P are the mid-points of AB, AC and BC respectively. If $MN = 3cm, NP = 3.5cm$ and $MP = 2.5cm$, calculate BC, AB and AC.

A. BC = 6 cm

   AB = 7cm

   AC = 5cm

B. BC = 6 cm

   AB = 7cm

   AC = 8cm

C. BC = 6 cm

   AC = 7cm

   AB = 5cm

D. none of these

Answer: A

▶ **Watch Video Solution**

59. Prove that the line segment joining the mid-points of the diagonals of a trapezium is parallel to each of the

parallel sides and is equal to half the difference of these sides.

> ▶ **Watch Video Solution**

60. In a triangle ABC median AD is produced to X such that $AD = DX.$ Prove that $ABXC$ is a parallelogram.

> ▶ **Watch Video Solution**

61. In $\triangle ABC$ the lines are drawn parallel to BC,CA and AB respectively through A,B and C intersecting at P, Q and R. Find the ration of perimeter of $\triangle PQR$ and $\triangle ABC$

> ▶ **Watch Video Solution**

62. $ABCD$ is a kite having $AB = AD$ and $BC = CD$. Prove that the figure formed by joining the mid-points of the sides, in order, is a rectangle.

63. Prove that In a parallelogram, opposite side are equal

64. The opposite angles of a parallelogram are equal.

65. The sides BA and DC of a quadrilateral $ABCD$ are produced as shown in Figure. Prove that $a + b = x + y$.

Figure

66. In a quadrilateral $ABCD$, AO and BO are the bisectors of $\angle A$ and $\angle B$ respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$.

67. The angle of quadrilateral are respectively $100°$, $98°$, $92°$. Find the fourth angle.

68. The angles of a quadrilateral are in the ratio $3:5:9:13$. Find all the angles of the quadrilateral.

Let the common ratio between the angles be 'x'

$\therefore$ the angles in ratio are $3x:5x:9x:13x$

Sum of angles of a Quadrilateral $=360^0$

$\therefore 3x + 5x + 9x + 13x = 360^0$

$30x = 360^0$

$x = 360^0 - 30$

$x = 12^0$

the angles will be:

$\Rightarrow 3x = 3 \times 12 = 36^0$

$\Rightarrow 5x = 5 \times 12 = 60^0$

$$\Rightarrow 9x = 9 \times 12 = 108^0$$

$$\Rightarrow 13x = 13 \times 12 = 156^0$$

> ▶ **Watch Video Solution**

69. A diagonal of parallelogram divides it into two congruent triangles.

> ▶ **Watch Video Solution**

70. In Figure, bisectors of $\angle B$ and $\angle D$ of quadrilateral $ABCD$ meet CD and AB produced at P and Q respectively. Prove that :

$$\angle P + \angle Q = \frac{1}{2}(\angle ABC + \angle ADC)$$

> ▶ **Watch Video Solution**

71. In a quadrilateral $ABCD$, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \dfrac{1}{2}(\angle A + \angle B)$.

72. Let ABC be an isosceles triangle with $AB = AC$ and let D, E, F be the mid-points of BC, CA and AB respectively. Show that $AD \perp FE$ and AD is bisected by FE.

73. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that (i) D is the mid-point of AC (ii) $MD \perp AC$ (iii) $CM = MA = \dfrac{1}{2}AB$

▶ Watch Video Solution

74. The line drawn through the mid-point of one side of a triangle, parallel to another side, intersects the third side at its mid-point.

▶ Watch Video Solution

75. In Figure, D, E and F are, respectively the mid-points of sides BC, CA and AB of an equilateral triangle ABC. Prove that DEF is also an equilateral triangle.
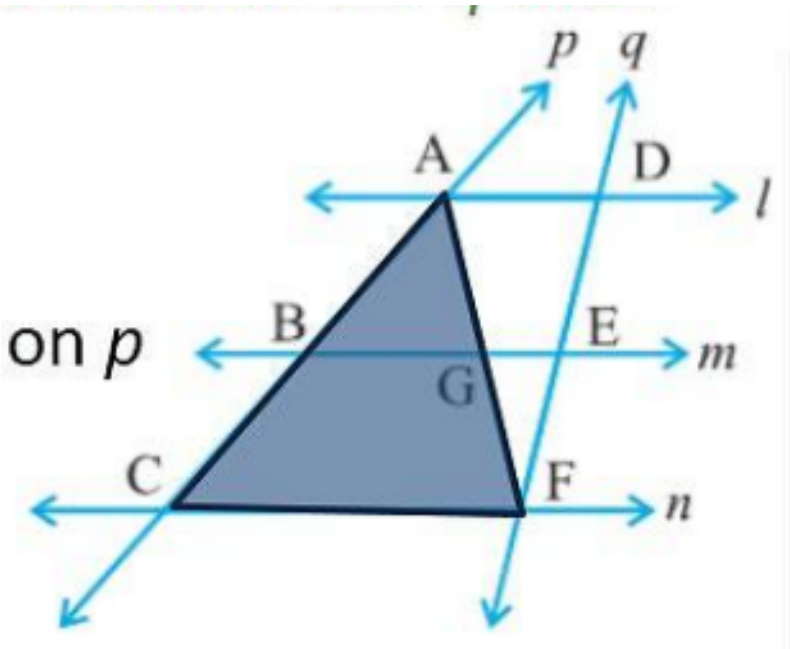

> ▶ **Watch Video Solution**

76. In $\triangle ABC$, D, E and F are respectively the mid-points of sides AB, BC and CA. Show that $\triangle ABC$ is divided into four congruent triangles by joining D, E and F.

> ▶ **Watch Video Solution**

77. l, m and n are three parallel lines intersected by transversals p and q such that l, m and n cut off equal intercepts AB and BC on p (see Fig. 8.28). Show that l, m and n cut off equal intercepts DE and EF on q also

78. $ABCD$ is a square E, F, G and H are points on AB, BC, CD and DA respectively, such that $AE = BF = CG = DH.$ Prove that $EFGH$ is square.

79. $ABCD$ is a rhombus, $EABF$ is a straight line such that $EA = AB = BF$. Prove that ED and FC when produced meet at right angles.

80. $ABCD$ is a parallelogram. AD is a produced to E so that $DE = DC$ and EC produced meets AB produced in

$F.$ Prove that $BF = BC.$

81. The line segment joining the mid-points of any two sides of a triangle in parallel to the third side and equal to half of it.

82. In a quadrilateral $ABCD$, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$

83. The angle of a quadrilateral are respectively $100°$, $98°$, 92 Find the fourth angle.

84. In a quadrilateral $ABCD$, the angles A, B, C and D are in the ratio $1:2:3:4$. Find the measure of each angles of the quadrilateral.

85. In a quadrilateral $ABCD, AO$ and BO are the bisectors of $\angle A$ and $\angle B$ respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$.

86. The angle of a quadrilateral are respectively $100°$, $98°$, $92°$ Find the fourth angle.

87. In a quadrilateral $ABCD$, the angles A, B, C and D are in the ratio $1 : 2 : 4 : 5$. Find the measure of each angles of the quadrilateral.

88. In a quadrilateral $ABCD$, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$.

89. The angles of a quadrilateral are in the ratio $3:5:9:13$. Find all the angles of the quadrilateral.

90. In a parallelogram $ABCD$, prove that sum of any two consecutive angles is $180°$

91. In a parallelogram $ABCD$, $\angle D = 115°$, determine the measure of $\angle A$ and $\angle B$

92. In a parallelogram $ABCD$ diagonals $AC \text{ and } BD$ intersect at $O \text{ and } AC = 6.\,8\ cm \text{ and } BD = 5.\,6cm$. Find the measures of $OC \text{ and } OD$

93. $ABCD$ is a parallelogram and line segments AX, CY bisect the angles A and C, respectively. Show that

$AX \mid \mid CY$

94. Given ABC , lines are drawn through A, $B \, and \, C$ parallel respectively to the sides BC, $CA \, and \, AB$, forming $PQRFigure$ .Show that $BC = \dfrac{1}{2}QR$

95. In Figure, AN and CP are perpendicular to the diagonal BD of a parallelogram $ABCD$ Prove that :

(i) $ADN \cong CBP$

(ii) $AN = CP$

96. In Figure, $PQRS$ is a parallelogram, $PO \text{ and } QO$ are, respectively, the angle bisectors of $\angle P \text{ and } \angle Q$. Line LOM is drawn parallel to PQ . Prove that: $PL = QM$ (ii) $LO = OM$

97. The diagonals of a parallelogram $ABCD$ intersect at OA line through O intersects AB at X and DC at Y Prove that $OX = OY$

98. In a parallelogram $ABCD$, the bisector of $\angle A$ also bisects BC at X Prove that $AD = 2AB$

99. $ABCD$ is a parallelogram. $L \, and \, M$ are points on $AB \, and \, DC$ respectively and $AL = CM$. Prove that $LM \, and \, BD$ bisect each other.

100. $PQRS$ is a parallelogram. PX and QY are respectively, the perpendiculars from P and Q to SR and RS produced. Prove that $PX = QY$

101. $ABCD$ is a parallelogram. AB is produced to E so that $BE = AB$. Prove that ED bisects BC

102. Two opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(50 - x)^\circ$ Find the measure of each angle of the parallelogram.

103. If an angle of a parallelogram is two-third of its adjacent angle, find the angles of the parallelogram.

▶ **Watch Video Solution**

104. Find the measure of all the angles of a parallelogram, if one angle is $24°$ less than twice the smallest angle.

▶ **Watch Video Solution**

105. The perimeter of a parallelogram is $22cm$ If the longer side measures $6.5cm$ what is the measure of the shorter side?

▶ **Watch Video Solution**

106. In a parallelogram $ABCD, \angle D = 135°,$ determine the measures of $\angle A$ and $\angle B$

107. $ABCD$ is a parallelogram in which $\angle A = 70°$ Compute $\angle B, \ \angle C$ and $\angle D$

108. In Figure, $ABCD$ is a parallelogram in which $\angle A = 60°$. If the bisectors of $\angle A$ and $\angle B$ meet at P,

prove that $AD = DP, PC = BC$ and $DC = 2AD.$

Figure

109. $ABCD$ is a parallelogram and E is the mid-point of BC, DE and AB when produced meet at F Then $AF =$

(a) $\dfrac{3}{2}AB$

(b) $2AB$

(c) $3AB$

(d) $\dfrac{5}{4}AB$

110. Which of the following statements are true (T) and which are false (F)? In a parallelogram, the diagonals are equal. In a parallelogram, the diagonals bisect each other. In a parallelogram, the diagonals intersect each other at right angles. In any quadrilateral, if a pair of opposite sides is equal, it is a parallelogram. If all the angles of a quadrilateral are equal, it is a parallelogram. If three sides of a quadrilateral are equa, it is a parallelogram. If three angles of a quadrilateral are equal, it is a parallelogram. If all the sides of a quadrilateral are equal it is a parallelogram

> ▶ **Watch Video Solution**

111. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

112. Show that the diagonals of a square are equal and bisect each other at right angles.

113. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square

114. In a triangle ABC median AD is produced to X such that $AD = DX.$ Prove that $ABXC$ is a parallelogram.

115. Two segments AC and BD bisect each other at O . Prove that $ABCD$ is a parallelogram.

116. If $ABCD$ is a rhombus with $\angle ABC = 56^0,$ find the measure of $\angle ACD$

117. ABCD is a rhombus. Show that diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.

118. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that:(i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D$..

119. In Figure, $ABCD$ is a trapezium in which $ABCD$ and $AD = BC$. show that : $\angle A = \angle B$ (ii) $\angle C = \angle D$ $ABC \cong BAD$ diagonal $AC = diagonal BD$

120. In Figure, $ABCD$ is a trapezium in which $ABCD$ and $AD = BC.$ show that : $\angle A = \angle B$ (ii) $\angle C = \angle D$ $ABC \cong BAD$ diagonal $AC = diagonal BD$

In Figure, $ABCD$ is a trapezium in which $ABCD$ and , $AD = BC$

121. In a parallelogram $ABCD$, determine the sum of angles $\angle C \ and \ \angle D$

122. In a parallelogram $ABCD$, if $\angle D = 135^0$, determine the measures of its other angles.

123. $ABCD$ is a square. $AC \text{ and } BD$ intersect at O. State the measure of $\angle AOB$

124. $ABCD$ is a rectangle with $\angle ABD = 40^0$. Determine $\angle DBC$

125. The sides $AB \: and \: CD$ of a parallelogram $ABCD$ are bisected at $E \: and \: F.$ Prove that $EBFD$ is a parallelogram.

▶ **Watch Video Solution**

126. $P \: and \: Q$ are the points of trisection of the diagonal BD of a parallelogram $ABCD.$ Prove that CQ is parallel to $AP.$ Prove also that AC bisects PQ.

▶ **Watch Video Solution**

127. $ABCD$ is a square $E, \: F, \: G \: and \: H$ are points on $AB, \: BC, \: CD \: and \: DA$ respectively, such that $AE = BF = CG = DH.$ Prove that $EFGH$ is square.

128. $ABCD$ is a rhombus, $EABF$ is a straight line such that $EA = AB = BF$. Prove that ED and FC when produced meet at right angles.

129. $ABCD$ is a parallelogram. AD is a produced to E so that $DE = DC$ and EC produced meets AB produced in F. Prove that $BF = BC$.

130. In Figure, D, E and F are, respectively the mid-points of sides BC, CA and AB of an equilateral triangle ABC. Prove that DEF is also an equilateral triangle.

Let ABC be the triangle and D, E and F be the mid-point of BC, CA and AB respectively.

We have to show triangle formed DEF is an equilateral triangle. We know the line segment joining the mid-points of two sides of a triangle is half of the third side

Therefore, $DE = \dfrac{1}{2} AB$

$EF = \dfrac{1}{2} BC$

$FD = \dfrac{1}{2} AC$

Now, $\triangle ABC$ is an equilateral triangle

$\Rightarrow AB = BC = CA$

$\Rightarrow \dfrac{1}{2} AB = \dfrac{1}{2} BC = \dfrac{1}{2} CA$

$\Rightarrow DE = EF = FD$

$\triangle DEF$ is an equilateral triangle.

> ▶ **Watch Video Solution**

131. Prove that the four triangles formed by joining in pairs, the mid-points of three sides of a triangle, are congruent to each other.

> ▶ **Watch Video Solution**

132. Let ABC be an isosceles triangle with $AB = AC$ and let D, E, F be the mid points of BC, $CA \, and \, AB$ respectively. Show that $AD \perp FE \, and \, AD$ is bisected by FE

133. $P,\ Q\ and\ R$ are, respectively, the mid points of sides $BC,\ CA\ and\ AB$ of a triangle ABC and AD is the perpendicular from vertex A to BC,then prove that the points P,Q,R and D are cyclic.

134. In Figure, $AD\ and\ BE$ are medians of $ABC\ and\ BE\ ||\ DF$. Prove that $CF = \dfrac{1}{4}AC$

Consider $\triangle\ ABC$ Since AD is Median

$\Rightarrow BD = BC\cdots$(1)

Since BE is Median $\Rightarrow AE = EC\cdots$(2)

Consider $\triangle BEC$ since $BE \mid\mid DF$

By Basic Proportionality theorm, $\Rightarrow B\dfrac{D}{D}C = E\dfrac{F}{F}C$

From (1) $\Rightarrow CF = EF$

$\Rightarrow CF = \dfrac{1}{2}AE$

From (2) $\Rightarrow CF = \dfrac{1}{4}AC$

▶ Watch Video Solution

---

135. In ABC, AD is the median through A and E is the mid-point of AD . BE produced meets AC in F (Figure). Prove that $AF = \dfrac{1}{3}AC.$

▶ Watch Video Solution

136. In a ABC , find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.

▶ **Watch Video Solution**

137. $ABCD$ is a rhombus and P, Q, R, S are the mid-points of AB, BC, CD, DA respectively. Prove that $PQRS$ is a rectangle.

▶ **Watch Video Solution**

138. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other

139. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.

140. $ABCD$ is a rhombus and P, Q, R, S are the mid-points of AB, BC, CD, DA respectively. Prove that $PQRS$ is a rectangle.

141. The diagonals of a quadrilateral $ABCD$ are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle.

▶ **Watch Video Solution**

142. Show that the quadrilateral, formed by joining the mid-points of the sides of a square is also a square.

▶ **Watch Video Solution**

143. In Figure, $ABCD$ is a parallelogram. $E\ and\ F$ are the mid-points of the sides $AB\ and\ CD$ respectively. Prove

that the line segments AF and CE trisect (divide into three equal parts) the diagonal BD .

144. $ABCD$ is a parallelogram. P is a point on AD such that $AP = \dfrac{1}{3} AD$ and Q is a point on BC such that: $CQ = \dfrac{1}{3} BC.$ Prove that $AQCP$ is a parallelogram.

145. P is the mid-point of side AB of a parallelogram $ABCD$. A line through B parallel to PD meets DC at Q and AD produced at $R.$ Prove that: $AR = 2BC$ (ii) $BR = 2\,BQ$

146. In Figure, $ABCD$ isa trapezium in which side AB is a parallel to side DC and E is the mid-point of side AD If F is a point on the side BC such that the segment EF is parallel to side DC . Prove that F is the mid point of BC and $EF = \dfrac{1}{2}(AB + DC)$.

147. Prove that the line segment joining the mid-points of the diagonals of a trapezium is parallel to each of the parallel sides and is equal to half the difference of these sides.

148. In ABC, D, $E \, and \, F$ are, respectively, the mid-points of BC, $CA \, and \, AB$. If the lengths of side AB, $BC \, and \, CA$ are 7cm, 8cm, and 9cm, respectively, find the perimeter of DEF

149. In a triangle $\angle ABC$, $\angle A = 50°$, $\angle B = 60°$ and $\angle C = 70°$. Find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.

150. In a triangle, $P, \ Q \ and \ R$ are the mid-points of sides $BC, \ CA \ and \ AB$ respectively. If $AC = 21 \ cm, \ BC = 29cm \ and \ AB = 30cm,$ find the perimeter of the quadrilateral $ARPQ$

151. In a ABC median AD is produced to X such that $AD = DX$. Prove that $ABXC$ is a parallelogram.

152. In a $ABC, E \ and \ F$ are the mid-points of $AC \ and \ AB$ respectively. The altitude AP to BC

intersects FE at Q Prove that $AQ = QP$

153. In a ABC, BM and CN are perpendiculars from B and C respectively on any line passing through A. If L is the mid-point of BC , prove that $ML = NL$.

154. In Figure, triangle ABC is right-angled at B. Give that $AB = 9CM$, $AC = 15CM$, and D, E are the mid-points of the sides AB and AC respectively, calculate

The length of BC

(ii) The area of ADE

155. In Figure, M, N and P are the mid-points of AB, AC and BC respectively. If $MN = 3cm$, $NP = 3.5cm$ and $MP = 2.5cm$, calculate BC, AB and AC

156. ABC is a triangle and through A, B, C lines are drawn parallel to BC, CA and AB respectively intersecting at P, Q and R. Prove that the perimeter of PQR is double the perimeter of ABC

157. Let ABC be an isosceles triangle in which $AB = AC$ If D, E, F be the mid-points of the sides $BC, CA \text{ and } AB$ respectively, show that the segment $AD \text{ and } EF$ bisect each other at right angles.

158. ABC is a triangle. D is a point on AB such that $D = \dfrac{1}{4}AB \text{ and } E$ is a point on AC such that $AE = \dfrac{1}{4}AC.$ Prove that $DE = \dfrac{1}{4}BC$

159. $ABCD$ is a parallelogram, $E \, and \, F$ are the mid-points of $AB \, and \, CD$ respectively. GH is any line intersecting $AD, \; EF \, and \, BC$ at $G, \; P \, and \, H$ respectively. Prove that $GP = PH$

160. $BM \, and \, CN$ are perpendicular to a line passing through the vertex A of a triangle $ABC.$ If L is the mid-point of BC, prove that $LM = LN$

161. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other

162. Fill in the blanks to make the following statements correct

The triangle formed by joining the mid-points of the sides of an isosceles triangle is ....

The triangle formed by joining the mid-points of the sides of a right triangle is ....

The figure formed by joining the mid-points of consecutive sides of a quadrilateral is ....

▶ **Watch Video Solution**

163. In a parallelogram $ABCD$, write the sum of angle A and B

▶ **Watch Video Solution**

164. In a parallelogram $ABCD$, if $\angle D = 115°$, then write the measure of $\angle A$

▶ **Watch Video Solution**

165. $PQRS$ is a square such that $PR\ and\ SQ$ intersect at $O.$ State the measure of $\angle POQ$

166. In a quadrilateral $ABCD$, bisectors of angles $A\ and\ B$ intersect at O such that $\angle AOB = 75°$, then write the value of $\angle C + \angle D$

167. The diagonals of a rectangle $ABCD$ meet at O . If $\angle BOC = 44°$, find $\angle OAD$

168. If $PQRS$ is a square, then write the measure of $\angle SRP$

▶ **Watch Video Solution**

169. If $ABCD$ is a rectangle with $\angle BAC = 32°$, find the measure of $\angle DBC$

▶ **Watch Video Solution**

170. If $ABCD$ is a rhombus with $\angle ABC = 56°$, find the measure of $\angle ACD$

▶ **Watch Video Solution**

171. The perimeter of a parallelogram is 22cm. If the longer side measures 6.5cm, what is the measure of shorter side?

172. If the angles of a quadrilateral are in the ratio 3:5:9:13, then find the measure of smallest angle.

173. If the bisectors of two adjacent angles A and B of a quadrilateral $ABCD$ intersect at a point O such that $\angle C + \angle D = k\angle AOB$, then find the value of k

174. If measures opposite angles of a parallelogram are $(60 - x)°$ and $(3x - 4)°$, then find the measure of angles of the parallelogram.

175. Complete each of the following statements by means of one of those given in brackets again each: If one pair of opposite sides are equal and parallel, then the figure is .... (parallelogram, rectangle, trapezium) If in a quadrilateral only one pair of opposite sides are parallel, the quadrilateral is .... (square, rectangle, trapezium) A line drawn from the mid-point of one side of a triangle

.... another side intersects the third side at its mid-point.   (perpendicular to, parallel to, to meet) If one angle of a parallelogram is a right angle, then it is necessarily a .... (rectangle, square, rhombus) Consecutive angles of parallelogram are .... (supplementary, complementary) If both pairs of opposite sides of a quadrilateral are equal, then it is necessarily (rectangle, parallelogram, rhombus) if opposite angles of a quadrilateral are equal, then it is necessarily a .... (parallelogram, rhombus, rectangle) If consecutive sides of a parallelogram are equal, then it is necessarily a .... (kite, rhombus, square)

176. The opposite sides of a quadrilateral have

(a)no common point (b) one common point two

common points (d) Infinitely many common points

177. The consecutive sides of a quadrilateral have

(a) no common point (b) one common point (c)two

common points (d) Infinitely many common points

178. $PQRS$ is a quadrilateral. $PR \: and \: QS$ intersect each

other $O.$ In which of the following cases, $PQRS$ is a

parallelogram? (a) $\angle P = 100^0$, $\angle Q = 80^0$, $\angle R = 100^0$

(b) $\angle P = 85^0$, $\angle Q = 85^0$, $\angle R = 95^0$ (c)

$PQ = 7CM$, $QR = 7CM$, $RS = 8CM$, $SP = 8CM$

(d)

$OP = 6.5cm$, $OQ = 6.5cm$, $OR = 5.2cm$, $OS = 5.2cm$,

179. Which of the following quadrilateral is not a rhombus?

(a) All four sides are equal (b) Diagonals bisect each other

(c) Diagonals bisect opposite angles (d) One angle

between the diagonals is 60°

180. If the two diagonals of a parallelogram are equal than show it is a rectangle.

181. We get a rhombus by joining the mid-points of the sides of (a) parallelogram (b) rhombus (c) rectangle (d) triangle

182. The bisectors of any two adjacent angles of a parallelogram intersect at: (a)30° (b) 45° (c) 60° (d) 90°

183. Show that the bisectors of angles of a parallelogram form a rectangle.

184. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a parallelogram (b) rectangle square (d) rhombus

185. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a parallelogram   (b) rectangle   (c) square   (d) rhombus

186. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.

187. The figure formed by joining the mid-points of the adjacent sides of a rhombus is a square   (b)

rectangle   (c) trapezium   (d) none of these

188. Show that the quadrilateral, formed by joining the mid-points of the sides of a square, is also a square.

189. The figure formed by joining the mid-point of the adjacent sides of a parallelogram is a rectangle   (b) parallelogram   (c) rhombus   (d) square

190. Find the measure of all the angles of a parallelogram, if one angle is $24°$ less than twice the smallest angle.

191. In a parallelogram $ABCD$, if $\angle DAB = 75°$ and $\angle DBC = 60°$, then $\angle BDC = $ $75°$ (b) $60°$ (c) $45°$ (d) $55°$

192. In a parallelogram $ABCD$, if $\angle DAB = 75°$ and $\angle DBC = 60°$, then $\angle BDC = $ (a) $75°$ (b) $60°$ (c) $45°$ (d) $55°$

193. $ABCD$ is a parallelogram and E and F are the centroids of triangles ABD and BCD respectively, then $EF = $ (a)AE (b) BE (c) CE (d)DE

194. $ABCD$ is a parallelogram, M is the mid-point of BD and BM bisects $\angle B$. Then, $\angle AMB = $ $45°$ (b) $60°$ (c) $90°$ (d) $75°$

195. $ABCD$ is a parallelogram and E is the mid-point of BC, DE and AB when produced meet at $F.$ Then $AF =$ $\frac{3}{2}AB$ (b) $2\ AB$ (c) $3\ AB$ (c) $\frac{5}{4}\ AB$

196. If an angle of a parallelogram is two-third of its adjacent angle, find the angles of the parallelogram.

197. If the degree measures of the angles of quadrilateral are $4x$, $7x$, $9x$ and $10x$, what is the sum of the measures

of the smallest angle and largest angle? 140^0 (b) 150^0 (c) 168^0 (d) 180^0

198. In a quadrilateral $ABCD$, $\angle A + \angle C$ is 2 times $\angle B + \angle D$. If $\angle A = 140°$ and $\angle D = 60°$, then $\angle B =$ $60°$ (b) $80°$ (c) $120°$ (d) None of these

199. If the diagonals of a rhombus are $18cm$ and $24cm$ respectively, then its side is equal to

(a)$16cm$ (b) $15cm$ (c) $20cm$ (d) $17cm$

200. The diagonals $AC \; and \; BD$ of a rectangle $ABCD$ intersect each other at $P.$ If $\angle ABD = 50°$, then $\angle DPC = \; 70°$ (b) $90°$ (c) $80°$ (d) $100°$

201. $ABCD$ is a parallelogram in which diagonal AC bisects $\angle BAD.$ If $\angle BAC = 35°$, then $\angle ABC = \; 70°$ (b) $110°$ (c) $90°$ (d) $120°$

202. In a rhombus $ABCD$, if $\angle ACB = 40°$, then $\angle ADB =$ (a) $70°$ (b) $45°$ (c) $50°$ (d) $60°$

203. In ABC, $\angle A = 30°$, $\angle B = 40°$ and $\angle C = 110°$. The angles of the triangle formed by joining the mid-points of the sides of this triangle are $70°$, $70°$, $40°$ (b) $60°$, $40°$, $80°$ (c)$30°$, $40°$, $110°$ (d) $60°$, $70°$, $50°$

204. The diagonals of a parallelogram $ABCD$ intersect at O. If $\angle BOC = 90°$ and $\angle BDC = 50°$, then $\angle OAB =$

$40°$ (b) $50°$ (c) $10°$ (d) 90^0

205. $ABCD$ is a trapezium in which $AB||DC$, M and N are the mid-points of AD and BC respectively. If $AB = 12cm,\ MN = 14cm,$ then $CD =$ 10cm (b) 12cm (c) 14cm (d) 16cm

206. Diagonals of a quadrilateral $ABCD$ bisect each other. If $\angle A = 45°,$ then $\angle B =$ $115°$ (b) $120°$ (c) $125°$ (d) $135°$

207. P is the mid-point of side BC of a parallelogram $ABCD$ such that $\angle BAP = \angle DAP.$ If $AD = 10cm,$ then $CD = $ 5cm (b) 6cm (c) 8cm (d) 10cm

208. In $ABC,$ E is the mid-point of median AD such that BE produced meets AC at $F.$ If $AC = 10.5\,CM,$ then $AF = $ 3cm (b) 3.5cm (c) 2.5cm (d) 5cm